

National Wetland Inventory and Riparian Mapping

Montana Wetland/Riparian Mapping Center

Fact Sheet

The National Wetlands Inventory (NWI) in Montana

The USFWS National Wetlands Inventory was begun in 1974 to map wetland and deepwater habitats across the United States. A uniform classification and mapping methodology was applied to create consistent wetland data across the country. These maps have been proven accurate by several studies throughout the U.S. and are widely used by resource planners and managers. The NWI also serves as the baseline mapping data used to track national wetland status and trends. Unlike most of the country, the NWI was never completed in Montana. Large areas of Montana have no digital wetlands data of any kind.

Montana Wetland/Riparian Mapping Center

The Montana Wetland Council recognized that wetland maps are the key tool in restoring, managing, and conserving Montana's wetlands. Additionally, existing wetland maps often did not follow a standard wetland definition, leading to maps that varied widely in their quality and usability. In response to these issues, the Montana Natural Heritage Program established the Montana Wetland/Riparian Mapping Center to map wetlands using NWI standards and map riparian areas with the companion USFWS system for western riparian areas. All the mapping is quality approved by NWI personnel, entered into the NWI national geodatabase, and is FGDC (Federal Geographic Data Committee) compliant.

Recent or Upcoming Montana Wetland/Riparian Mapping Center Projects

- Bitterroot Watershed
- Flathead Watershed
- Gallatin Watershed
- Upper Clark Fork Watershed
- SW MT (the Big Hole, Ruby, Madison, Beaverhead, and Red Rocks watersheds)
- Isolated wetland study (random quads across MT)
- Custer N.F. and BLM lands in Eastern MT

The Governor and Director's of Montana DNRC, DFWP and DEQ endorsed the state's new wetland plan titled *Priceless Resources: A Strategic Framework for Wetland and Riparian Area Conservation and Restoration in Montana 2008-2012*. This *Strategic Framework* supports the MTNHP Wetland and Riparian Mapping Center as the standardized provider of wetland mapping in Montana, which provides consistency, accuracy and information availability to all citizens.

Standards and Technical Mapping Details

The Federal Geographic Data Committee (FGDC) recognizes NWI data as the foundation for the wetlands data layer in the National Spatial Data Infrastructure and has set draft standards for the data (FGDC Wetland Subcommittee and Wetland Mapping Standard Workgroup 2007). The Montana Geospatial Strategic Plan (Montana Land Information Advisory Committee 2006) recognizes wetland data as a priority spatial data infrastructure layer for Montana and the Montana Land Information Plan endorses NWI mapping as the preferred wetland data layer source (Montana Land Information Plan Subcommittee 2007). The Montana Land Information Act Wetland Data Theme Advisory Group recommends the MTNHP Wetland/Riparian Center as the preferred provider of NWI mapping in Montana. USFWS national technical standards (USFWS 2004) are followed throughout the mapping and

quality control process. We will follow new FGDC standards when they are in final form later this year or next year.

Data Environment

Wetlands and riparian areas are digitized in an ArcMap GIS environment on 2005 or 2006 color infrared 1m resolution digital imagery. Several ancillary data layers are integrated into the GIS project to improve accuracy, including other sources of imagery, a digital elevation model, hydrography, soils maps, ground-verified soil survey plots, land cover data, amphibian inventory photos and data, the original NWI data if available, and any other available wetland delineations or mapping. A wetland digitizing technician delineates individual polygons and attributes each with the appropriate wetland or riparian type codes. The working mapping scale is 1:5,000.

Quality Control

Mapping is 100% reviewed by another individual. Questionable areas are noted, reviewed by the original mapper, and either resolved or marked for field checking. After the internal quality control, the mapping is sent to the NWI Regional Coordinator for quality approval and incorporation into the national NWI geodatabase. Field spot checking includes problematic areas, characteristic types, and wetland or riparian areas of high ecological significance, which are entered into the MTNHP database.

Accuracy and Metadata

Maps must depict 90% of all wetlands > 1 acre and have 95 percent of the mapped features correctly classified to the NWI Class level to be acceptable (USFS 2004). 100 percent of the classification attributes for adjacent features must agree, and delineations for adjacent features or wetland boundaries must be within 33 feet (10 meters) of their location on the image (USFS 2004). Metadata must be developed to NWI standards.

Limitations

While the NWI provides a good clue that jurisdictional wetlands are present, it does not directly identify jurisdictional wetlands – that task requires a site investigation. Additionally, the NWI wetland definition is slightly different than the current jurisdictional wetland definition. Our NWI mapping includes field verification, but that is not a 100% survey and is limited to primarily public land due to access issues.

Applications

User surveys have documented more than 100 uses of NWI maps (Wilén and Bates 1995). Applications include:

- Preliminary site assessment for the presence of wetlands
- Watershed planning
- Habitat protection
- Facility and transportation/corridor siting
- Oil spill contingency planning
- Conservation incentive programs
- Wildlife surveys (identification of important habitats)
- Conservation area planning

- Inventory stratification by wetland type
- Identification of rare plant and animal habitat
- Fisheries restoration
- Floodplain planning
- Water quality protection

Frequently Asked Questions

Can't we do this faster and cheaper with satellite remote sensing?

The primary difference is scale. Satellite remote sensing is usually based on Landsat TM imagery with a 30m X 30m pixel size. Mapping based on these pixels typically has a 1 or 2 acre minimum mapping unit; most of Montana's wetlands will be missed because they tend to be small in size. For example, of 611 total wetland areas mapped to NWI standards in the Bitterroot National Forest, 462 are less than 2 acres in size. The minimum mapping unit for our current NWI mapping is about .01 acre.

How about soil maps, they map wetlands, don't they?

Soil maps do map hydric soils, which are wetland soils, but the primary difference is also scale. Soil maps also have minimum mapping units that are too large to capture many of our small wetland areas. Also, soils are often mapped as a complex of soil types, if wetlands are part of the complex, they will not be delineated individually and may only be noted as occupying a certain percentage of the mapped unit.

We have the original NWI digitized in our area, is that good enough?

The original NWI was based on drawing ink lines on relatively coarse-scale aerial photographs, and later transferring these drawings to a digital file. While the original NWI represents a worthy early effort in delineating wetlands, this process introduces positional inaccuracies from a few to many meters and missed many wetlands because of the scale of the aerial photography and lack of field verification. Our current mapping technology using high-resolution imagery with considerable ancillary data enables a much improved product. Additionally, the early 1980's NWI creation date means that these wetland maps will be considerably dated, especially in developing areas. Much of Montana does not have original NWI digital data.

Value-added Interpretative Information

Interpreting what a map type represents is critical in helping managers and planners use and understand the data. MTNHP is building a field guide to NWI types (Appendix 1) on our website that includes photos, environmental characteristics, ecological dynamics, management considerations, and vegetation characteristics including links to National Vegetation Classification System types with further information content detailed in our vegetation community field guide.

MTNHP is building an information system that links map types to detailed information about 10 ecological functions including nutrient cycling, sediment retention, aquatic habitat, terrestrial habitat, water storage and peak flow modification, streamflow maintenance, groundwater discharge, bank stabilization, native plant community maintenance, and the conservation of wetland biodiversity. We can associate functions with wetlands because we additionally code each mapped wetland type with a hydrogeomorphic (HGM) code (Appendix 3) that provides information on the geomorphic setting, water source, and hydrodynamics. The NWI codes provide vegetation and water regime data – when combined

with HGM codes we have enough information about a wetland to associate performance levels (high, moderate, low) to each of the 10 functions. With this information system users can manage and plan based on the primary value of wetlands – their ecological functions.

Wetland and Riparian Classification Systems

Wetland Classification

- Mapped wetlands are classified with the nationally used USFWS NWI classification (Cowardin et al. 1979)
- NWI codes detail the vegetation type (or substrate), water regime, and alterations by humans or beavers
- Also coded for hydrogeomorphic (HGM) type (based on water source, hydrodynamics, and the geomorphic setting)
- NWI – HGM combination code is linked to levels of 10 hydrologic, habitat, and biogeochemical wetland functions.

Riparian Classification

- Riparian areas are classified with the USFWS System for Mapping Riparian Areas in the Western U.S. (USFWS 1997)
- Similar to NWI coding – details vegetation type and water source

References

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